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THE UNITED STATES PATENT AND TRADEMARK OFFICE


Applicant: Philip L. Hower, et al. Docket No: TI-30010
Serial No: 10/036,323 Conf. No: 3224
Examiner: Thomas L. Dickey Art Unit: 2826
Filed: 12/31/2001
For: N-CHANNEL LDMOS WITH BURIED P-TYPE REGION TO PREVENT PARASITIC
BIPOLAR EFFECTS

REPLY BRIEF

Mail Stop Appeal Brief - Patents
Commissioner For Patents
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Ann Trent

Dear Sir:

The following Reply Brief is respectfully submitted in triplicate and in connection with the above identified application in response to the Examiner's Answer mailed January 29, 2004.

REMARKS

The examiner refers to Appellants brief and specifically to a statement on the bottom of page three that states, "It should also be noted that claim 14 comprises the limitation of p-type surface body diffusion and a separate 'channel region.'" In describing the Appellants interpretation of claim 14 the examiner states "[T]his statement simply misstates the plain language of claim 14." With regards to this statement, the examiner has confused the meaning of the word separate as used in the above quoted statement. As used above, the word separate means 'distinct from

others.' A meaning consistent with that given in the Webster's II new Riverside Dictionary.

Claim 14 states in its entirety,

An n-channel DMOS transistor source structure, comprising:
an n-type source diffusion, ohmically connected to a source metallization;
a p-type surface body diffusion which laterally surrounds at least part of said source diffusion;
a conductive gate structure which is capacitively coupled to part of said p-type surface body diffusion to define a channel region therein;
a p-type buried body diffusion which underlies said channel and at least part of said surface body diffusion; and
an ohmic connection between said buried body diffusion and said source metallization;
whereby said buried body diffusion diverts hole current to bypass said source diffusion, and thereby reduces emission of secondary electrons, and thereby increases the safe operating area of the device.

The language in question in claim 14 has been underlined above. The limitation defines a channel region that is within the p-type surface body region. The language of the claim defines a channel region that is separate (different from) the p-type surface body diffusion region and contained within the p-type surface body region. By differentiating the channel region from the p-type surface body region, the claim eliminates the possibility that the channel region can be the p-type surface body region.

In the answer, the examiner agrees with the Appellant that in an n-MOSFET, when the voltage on the gate exceeds the threshold voltage, an n-type surface inversion layer called a channel is formed. The examiner goes on to take the position however, that if it were critical to the invention for the p-type buried body to be formed under the

n-type surface inversion layer, this critical information should have been introduced in the Applicant's specification and not withheld until the eleventh hour and supplied as an attachment to the Appellant's brief. This statement by the examiner ignores the language of claim 14 which states, "a p-type buried body diffusion which underlies said channel and at least part of said surface body diffusion". The p-type buried body underlying the channel (i.e. the inversion layer) is a part of the claimed invention. Clearly then, this could not have been withheld until the eleventh hour as stated by the examiner. It should be assumed that all claimed elements are critical to the claimed invention.

In the examiner's answer, the examiner focuses on the specification rather than on the plain language of the claim. It is now well established that claim construction must begin with an analysis of the ordinary meaning of the claim. It is well settled that dictionaries provide evidence of a claim term's "ordinary meaning." Such dictionaries include dictionaries of the English language, which in most cases will provide the proper definitions and usages, and technical dictionaries, encyclopedias and treatises, which may be used for establishing specialized meanings in the particular fields of art. The Appellant has provided the ordinary meaning of the word "channel" as used in the semiconductor arts and claim 14 as provided under patent law. Instead of focusing on the language of the claims, the examiner has instead chosen to try and "read" the specification into the claims to interpret claim 14. The Appellant will now respond to each of the examiner's arguments.

The examiner argues that "[O]n page 5 line 25 Applicants state that the buried body is placed beneath the source and p-type body. No mention of channels." There is no need to discuss channels when describing the source and the p-type body. These are independent entities. Placing the buried body beneath the source and p-type body is not mutually exclusive with placing the buried body beneath the channel.

The examiner states that "[O]n page 8 line 22 Applicants state that the channel region is of first conductivity type, the opposite type from the second conductivity type

source (page 8 line 26)." This is a misstatement of what the disclosure actually states. On page 8, line 22 the disclosure states "[T]he D well 20 defines a channel region 22 of a first conductivity type between the outer edges of the D-well 20 and source region 18." In referring to the structure to which this statement is directed (i.e. Figure 1), it is clear that the D-well defines the region in which the channel is formed. In other words, the inversion channel region is formed in the D-well region. The first conductivity type refers not to the channel, but instead refers to the conductivity type of the D-well region. The structure shown in Figure 1 is clearly an enhancement mode NMOS type device. Such a device is well known to persons of ordinary skill in the art to require the formation of a channel region in the p-body 20 to form a conductive path between the source and drain. The examiners interpretation of the above statement would render the device inoperable. The statement must be interpreted within the context of the operable device shown in Figure 1. Furthermore, the Appellants describe experimental data obtained from the structure described in Figure 1. These experimental results were obtained from the structure shown in Figure 1, and can only be obtained with the formation of a channel in the p body between the source and drain. Because there is only one way for the experimental results to be obtained, the formation of the channel flows naturally from the experimental results and is inherent in the results. The examiners statement that the experimental results do not describe the structure is therefore moot.

The examiner further interprets the Appellants disclosure to mean that the gate need not cover all of the channel region. The examiner ignores the clear language of claim 14 which states, "a conductive gate structure which is capacitively coupled to part of said p-type surface body diffusion to define a channel region therein." Since it is the capacitive coupling that defines the channel region, the gate must necessarily cover the entire channel region. The gate need not cover the entire p-type surface body region however, and the examiner seems to have confused the p-type surface body region with the channel region.

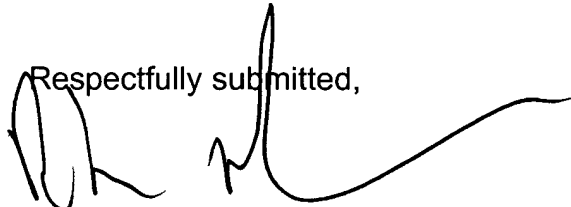
The examiner's final paragraph is a misstatement of the established claim construction principles stated above. What the examiner done in the final paragraph of

the answer is read the specification into the language of the claim 14 to change the plain meaning of the claim. The examiner has applied an overly broad interpretation to claim 14 to read the Huang et al. patent on claim 14. The Huang et al. patent does not read on claim 14 and claim 14 is allowable. Claims 16 and 18 depend on claim 14 and are also allowable over the cited art.

In light of the above, it is respectfully submitted that the present application is in condition for allowance, and notice to that effect is respectfully requested.

While it is believed that the application is now in condition for allowance, should the Examiner have any further comments or suggestions, it is respectfully requested that the Examiner contact the undersigned in order to expeditiously resolve any outstanding issues.

To the extent necessary, the Appellants petition for an Extension of Time under 37 CFR 1.136. Please charge any fees in connection with the filing of this paper, including extension of time fees, to the deposit account of Texas Instruments Incorporated, Account No. 20-0668.

Respectfully submitted,


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